THE MOTOR AGE

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BRITISH 1,000-MILES TRIAL

The Automobile Club of Great Britain and Ireland is, at the present time, running what is probably the most extensive and instructive trial of motor-vehicles that has ever been inaugurated, and one which should prove of inestimable benefit to the industry in the snug little isle. The trial is known as the Automobile club's 1,000-mile trial.

The object for which the promoting club labored was to get as many vehicles as possible together, whether entered by their makers and agents, or individuals, and then have them make a pilgrimage through all the principal cities of Great Britain, starting at London and going westwardly to Bristol and then northwardly to Edinburgh and returning to London, occupying eighteen days for the journey and passing through all the principal towns en route. The trip, which is just short of 1,000 miles, is now in progress. Stops are made at various of the largest cities where exhibitions of the vehicles are given for a day or less.

The entries are divided into two classes, the vehicles entered by companies interested in their manufacture and vehicles

owned by individuals who have no financial interest in their manufacture. The programme of the run is as follows:

Programe of the Run

April 23—London to Bristol.
April 24—Exhibition at Bristol.
April 25—Bristol to Cheltenham. Mid-day Exhibition at Cheltenham. Cheltenham to Birmingham.
April 26—Exhibition at Birmingham.
April 27—Birmingham via Matlock and Buxton to Manchester. Hill-climbing competition en route to Buxton, from two miles past Ashford to the Waterloo Inn.
April 28—Exhibition at Manchester.
April 30—Manchester to Kendal. Hill-climbing competition, from Kendal up to Shap Fell, a distance of ten miles.
May 1—Kendal to Carlisle. Hill-climbing trial at Dunmail Raise.
May 2—Carlisle to Edinburgh. Hill-climbing trial, Moffat to Birkhill, eleven miles.
May 3—Exhibition at Edinburgh.
May 4—Edinburgh to Newcastle-on-Tyne.
May 5—Exhibition at Newcastle.

May 7—Newcastle via Durham, Northallerton, York to Leeds.
May 8—Exhibition at Leeds.
May 9—Leeds to Harrogate, Bradford, Wakefield to Sheffield.
May 10—Exhibition at Sheffield.
May 11—Sheffield to Lincoln via Clumber Park. Optional run through the Duke of Portland's Welbeck Estate, Worksop to Mansfield and back. Exhibition at Lincoln. Lincoln to Nottingham.
May 12—Nottingham to London.

Large Cities All Included

The accompanying map shows the route of the pilgrimage. It will be seen that the zig-zag course takes in all the principal cities of England and Scotland. The effect of a procession of the latter day vehicles over such a course, forming, as they do, a procession which takes from one to two hours to pass a given point, can better be imagined than described.

For the following details of the progress of the pilgrimage credit is due the New York Herald and its special cable dispatches:

Interest at London

London, April 23.—People have stated that there was little interest taken in automobilism in England, but none can say so again after seeing the wonderful sight which I saw this morning when the largest assemblage of autocars ever seen in England was gathered together.

There must have been a hundred of them in all, that including those who came to see the sight but not to take part in the race.

Early as the hour was, seven o'clock, the great space at Hyde Park Corner and away down Grosvenor Place was black with people, all apparently deeply interested. There were hundreds upon hundreds of bicyclists, and people on horseback.

Vehicles Criticised

Each car as it came was minutely criticised. I think that perhaps the Daimler-Parisian, a very handsome blue car, was most admired, but almost equally so was the Richard car of the Automobile Manufacturing Co.

The Decauville and the Gladiator voiturettes, which appeared with flags, seemed to be most popular with the ladies.

The Peugeots, with their vast tires, were very much examined, especially by a large number of mechanics who happened to be passing at the time.

It was altogether a wondrous sight, ranging from monsters like the beau ideal of Hewetson down to the tiny De Dion tricycle, and from the great Balmoral char-a-banc of the Motor Co., holding sixteen persons and weighing thirty-five hundredweight (3,920 pounds), with its twelve horsepower, down to Wilson's Ariel tricycle, all apparently going with the same ease and steering with equal facility.

Extremes of Prices

The most expensive machine in that great show was a one horse Napier, which only takes two passengers, including the driver, and costs £1,300 ($6,500), while the cheapest was a diminutive tricycle, No. 12 of the Motor Manufacturing Co., of two-and-a-half horsepower, at £75 ($375).

By far and away the most curious machine was a pointed headed autocar of dull gray, which was variously called by the crowd "the ram," "the torpedo" and "the shark's mouth."

It was a weird looking thing, made by Vallee, of Le Mans.

As laggards were still rushing up, the signal of seven o'clock was given, and the start away began in a file, followed by a dense crowd, round the corner of St. George's Hospital, crowds lining either side of the streets.

Distinguished Participants

Among those who took part in the journey were Viscount Kingsborough, the Hon. John Scott Montagu, Lady Cecil Montagu, Captain the Hon. Cecil Duncombe, Mr. Roger William Wallace, Q. C.; the Hon. C. S. Rolls and Mr. Alfred Harmsworth, who had sent both his Panhard and his Daimler Parisian.

"As the morning advanced," writes the Daily Mail representative on the tour, "whole villages and towns turned out to watch the cars as they swung through on their way westward.

"Reading, Newburg, Marlborough, Colme and Chipperham were en fete in honor of the great trip.

"Between Dewbury and Hungerford the county police were very much in evi-

dence at every milestone, but no driver was warned nor name taken. The police, however, made a great show of noting the numbers entered on the cars, which were running to schedule, but took no notice of the private vehicles, which traveled at what pace they would.

"Throughout the run I noted but one horse that showed real fright at the cars.

"The Bristol population is enthusiastic.

"Only one breakdown is reported up to the present.

"Performed under excellent conditions, the whole run of 118½ miles has proved so satisfactory that the success of the trial is already assured."

Bristol to Birmingham

London, April 25.—The motor-vehicles yesterday went from Bristol to Birmingham without mishap.

Cheltenham was reached in good time, before luncheon.

The fifty-one competing cars were ranged in the Winter Gardens, and remained on show until three o'clock. At three o'clock sharp the cars left Cheltenham in procession, making a grand show in the streets, which were lined with sightseers.

The ancient town of Tewkesbury was also much excited.

Once the northern slopes of the Lickey Hills had been descended spectators began to thicken all along the line from Selby Oak into the very center of the Midland metropolis.

Birmingham Exhibition

London, April 26.—By noon yesterday the cars engaged in the great motor trial that reached Birmingham on the previous day, were clean in Marshall Bingley Hall for public inspection.

Moving about among the visitors, the scraps of conversation occasionally overheard indicated the growing interest which the public is taking in the new means of locomotion. It is a happy sign that the fair sex, who were well represented yesterday, closely examined the vehicles and appeared to be quite enthusiastic over the big powered cars, such as the Hon. S. C. Rolls' and John Scott Montague's similar vehicles, which were veritable ships of the road and greatly impressed many of the people who had come to Birmingham to market.

Some Vehicles Suffer

Late in the afternoon a considerable sensation was caused by the sudden and unexpected entry of Mr. Harmsworth's splendid twelve horsepower Panhard, which had just arrived from Reading by road. Her handsome metal mountings and beautiful carriage finish were the subject of general remark.

The stress of travel is being felt by some of the less perfect cars; no fewer than seventeen were outside twelve miles an hour average in the run from Cheltenham to Birmingham, Wednesday.

The Route to Manchester

London, April 27.—The thirty autocars entered by manufacturers and the sixteen privately entered vehicles left Birmingham yesterday morning for Manchester, via Lichfield, Burton, Derby, Matlock, Bath and Buxton.

A fine rain was met with between Sutton, Coldfield and Lichfield. This, however, was preferable to the dust of the two previous days' runs.

Derby's streets were lined with sightseers, who cheered the cars as they climbed a stiff hill in the town.

Hill Climbing Contest

The competing vehicles were subjected to the first severe hill climbing test in the afternoon, being timed up Taddington Hill, a rise of about 650 feet in two-and-a-half miles, one in sixteen being the steepest slope.

The cars made the ascent with more or less success, but until the official times are issued it will be impossible to institute comparisons.

A seven horsepower Pengeot, a non-competitive car, made the ascent in 13 minutes 58 seconds.

The steep, tortuous descent from the summit of Macclesfield tested the nerves and steering abilities of all the drivers, but there was no accident of any kind, save the shedding of some mechanism by Mr. Rolls, so far as can be ascertained.

Indeed, the run was made without any mishap.

There have been a few temporary failures and one bad breakage to a voitu-

rette, but no injury of any kind to passengers.

Times for Hill Climbing

London, April 30.—In the first hill climbing trial in the one thousand mile test run of the Automobile Club some fast runs were made up two and a half miles, rising at a gradient of one in twenty on an average.

The following are the official records of the speeds attained up Taddington Hill:

Ariel tricycle, Mr. A. J. Wilson, average miles an hour, 19.

Twelve horsepower Panhard, Mr. C. S. Rolls, 17.17.

Ariel "quad," 15.13.

Twelve horsepower Daimler, Mr. J. A. Holben, 14.4.

Ariel tricycle, with trailer, 14.4

Eight horsepower Napier, Mr. S. Kennard, 13.74.

Twelve horsepower Daimler, Mr. J. S. Montagu, 11.19.

Stanley steam car, 10.08.

De Dion voiturette, 10.08.

Eight horsepower Panhard, Mr. Mayhew, 10.08.

Wolseley voiturette, 10.08.

Simms motor wheel, 9.45.

Eight horsepower Pengeot, 9.45.

Motor Carriage Co. Triumphs, 9.45.

Daimler-Parisian, 9.15.

Star voiturette, 9.15.

Enfield "quad," Mr. E. M. Iliffe, 9.15.

Eight horsepower Lanchester carriage, 8.62.

Moss petit duc, Mr. R. E. Philips, 8.39.

Six horsepower Parisian-Daimler, Mr. Siddely, 8.39.

Gladiator voiturette, 8.17.

Six horsepower Panhard, Mr. T. B. Browne, 8.17.

Six horsepower Parisian-Daimler, Mr. W. Exe, 8.17.

Twenty-one other cars made times at speeds ranging from four and a half to seven and three-quarter miles per hour.

FROM THE FOUR WINDS

THE AUTO CANAL MULE

Philadelphia, April 30.—On Thursday last the first of the electric motors that are to displace horses on the tow-paths of the Delaware & Raritan Canal arrived at Trenton, and the following day the machine was privately tested in actual service. The "mechanical mule" is a ponderous affair, weighing several tons, and resembles a "cumbersome farm wagon," as one of the Associated Press correspondents described it.

The actual test was entirely satisfactory, but there was an aftermath that the master of ceremonies had neglected to have printed on the official programme. The "mule" was hitched to a bluff-bowed, 100-ton canal-boat evidently of Herreshoff design, and walked away with it so easily as to open the eyes of the many doubters who had previously refused to believe it capable of taking a convoy of half-a-dozen such craft at a time at the average rate of "speed" obtaining on the present-day inland waterway. Such is the claim that had been made for it.

At the conclusion of the test, which was quite exhaustive, the conductor of the "mule" tried to lead it back to its stable; but, like all mules, there was a thick streak of stubbornness somewhere on its make-up, and it suddenly cavorted full speed ahead along the tow-path. Perhaps somewhere in its mechanical vitals it felt an irrepressible spirit of freedom assert itself at being relieved of its nautical burden; at any rate neither threats nor cajolery seemed to have any effect upon it, and after an exhibition of its mulish paces forward, it suddenly stopped and began to come back toward the crowd at an equally fast clip. Everybody at once makes tracks for tall timber. All this time the conductor was frantically endeavoring to assuage the interior pain that had evidently made his muleship so rambunctious; but his "inwards"

were evidently out of gear, for after cavorting up and down the path a few times it started up the bank; but the latter happened to be of the seventy-five per cent variety, and the mule was compelled to give that up. Then, remorseful, perhaps, for its shortcomings, it backed deliberately down the bank, across the path and kerplunk! into the canal. It was fished out later in the day.

Superintendent Henry W. Dunn, of the canal company, declared himself to be perfectly satisfied with the test of the "mule," and says that when some imperfections in the machinery are corrected it will be all that is claimed for it.

The Delaware & Raritan Canal is the first inland waterway in this country to adapt the automobile idea to canal-boat traction, and the officials of the company are of the opinion that when the system is completely installed the resultant annual saving in expense—especially in view of the high and rising prices of horseflesh and feed—will be considerable.

AUTOMOBILISM IN GERMANY

Berlin, April 18.—That there is nothing new under the sun is amply testified by the entry in an old Saxon chronicle of the year 1504, which tells of a "burgher of Pirna who bought a carriage with screws to be turned and without needing a horse to pull it. He was to ride in it to Dresden, but stuck in the mud not far from that town." How he finished his journey, history sayeth not. The little clipping proves that motors were just as kittle cattle in centuries past, as they are in these days of rapid improvements.

An automobile exhibition is being planned for Frankfort-on-the-Main; Adam Opel, the well-known cycle and automobile manufacturer, is at the head of the movement, which is favorably received throughout mid-Germany.

A company has been formed in Berlin for the purpose of instituting a permanent automobile exhibition in the German metropolis. The leading financial and sporting men have offered their assistance in the floating of the company and the new undertaking is well supported. The exhibition halls are to be in the vicinity of the Friedrich Strasse Station, the busiest center of the city, and the show is to bear an international character, as the leading firms of all countries are to be approached with a view to exhibiting their goods.

The Frankfort fire brigades are to be provided with motor-cars in a very short time.

Wurzburg in South Germany seems to still be in an antediluvian state of easy-going conservativeness. A contractor had petitioned the authorities for the permission to introduce motor conveyances into quaint old Wurzburg and had duly received the coveted concession, when the town-council, indignant at such a daringly progressive step, protested against the police permission and embittered the poor contractor so much by putting unnecessary difficulties in his way, that he has now withdrawn all his propositions and given up the idea of introducing motors into a town guided by so narrow-minded and bigoted a council as that of Wurzburg.

MAIL COLLECTION IN WASHINGTON

Washington, D. C., April 28.—The utility of the automobile as a means of collecting mail was amply demonstrated to the local postal authorities during the past week. The Oakman Motor Vehicle Co., through its representative, P. J. Fisher, Jr., conducted a series of experiments with one of its vehicles and the results achieved were highly gratifying. The hardest route in the city, embracing forty-two boxes, was selected for the experiments, and was covered in exactly forty-three minutes. One man operates the vehicle, while another made the collections. A two-horse wagon and six men are now employed on this route and they take all the way from one and a half to one and three-quarters of an hour to cover it. The mail is cancelled and sacked ready to be placed on the trains in this vehicle. With an automobile the work could be done at the main office by the regular force of men, and not only would considerable time be saved, but the services of at least four men could be dispensed with.

While the officials were well pleased

with the work accomplished by the automobile, they declined to state whether or not they would make any recommendations looking to the substitution of the automobile in place of the present system.

AUTOMOBILE CLUB RUNS

New York, April 28.—The date of the big run of the Automobile Club of America to Philadelphia has been set for Saturday, June 2, starting at 7:30 a. m. and returning the following day. Other fortnightly Saturday club runs scheduled are: Babylon, L. I., May 5; West Point, N. Y., May 19; Bernardsville, N. J., June 16; Asbury Park, N. J., June 30. The start for next Saturday's Babylon run will be from Astor Court at 8:45 a. m. This run embraces the course recently covered in the big fifty-mile race and it is probable that the "fast pacers" will have it out again, as there are still some differences of opinion to be settled. Arrangements have been made for luncheon at Babylon.

KANSAS CITY EXHIBITION

The Kansas City Automobile Co. of Kansas City, Mo., write that they have sent the following letter to automobile manufacturers:

"We have received so much encouragement from all sources that it becomes necessary for us to write you again in regard to the proposed exhibition of motor-vehicles that Kansas City is arranging to come off during the time of the holding the National Democratic Convention here, and say to you that we will be prepared to find place for any sort of vehicle you may choose to send.

"The exhibition will be open for everyone who may come. We have about 150 miles of fine paved streets and 150 miles of fair macadam roads and a race track in fine order, so that we can give everyone a chance to show off in all sorts of ways agreeable to them. Will you come with something? There has been no better opportunity to show off to the nation since the industry assumed substantial proportions in the United States.

"We will thank you for an early reply and any advice you may offer, so that we may determine the matter as soon as possible. Kansas City will give you the best she has—'and she is a hustler.' It will be a great time for the motor-vehicle lovers to meet and swap experiences. We expect vehicles from all over the United States from individual owners as well as manufacturers.

"Rich and poor, old and young, will turn all attention to make this a great success; from school children up they will do anything and everything 'for you' and for our 'great convention hall.'"

AN AUTO COURSE OF STUDY

New York, April 29.—Recognizing the important part the automobile is to play in mechanical science Columbia University has just established a department of motor vehicle construction in the School of Mines.

This suggests the thought that the universality likely before long to exist in motor locomotion in everyday life may so far influence education as to demand elementary instruction in motor mechanism even in the public schools.

THAT AUTO STAGE LINE

New York, April 29.—Motor Age in a recent issue set forth the plans of the New York Electric Vehicle Co. for the establishment of auto-stage lines on Fifth Avenue and the cross streets.

Power to carry out these plans has just been placed in the hands of William C. Whitney and his associates by the signing, by Gov. Roosevelt, of what is known as the Goodsell bill. This bill, which was introduced in the State Legislature by Senator Goodsell, is entitled "An act to amend the Transportation Corporations law by the addition of a new section in relation to existing routes and extensions." It authorizes any corporation that has operated a stage route continuously for five years last past, in any city of the first class (New York or Buffalo), to extend its routes in any direction without further authority than the approval of the State Railroad Commissioners.

WEEKLY PATENT OFFICE BUDGET

OVERMAN AND BULLARD'S PATENT

Letters patent No. 648,286 to Albert H. Overman and James H. Bullard, Springfield, Mass.

Mr. Overman was the chief owner and leading spirit of the late Overman Wheel Co., which bore the reputation of making bicycles that were among the very best offered to the American public. They were so good, indeed, that their cost was too great to permit the once prosperous factory to conduct a lucrative business when the prices of bicycles came down to the point where no one made any great profits. Mr. Bullard is one of the pioneers of motor-vehicle construction and has already figured as a patentee.

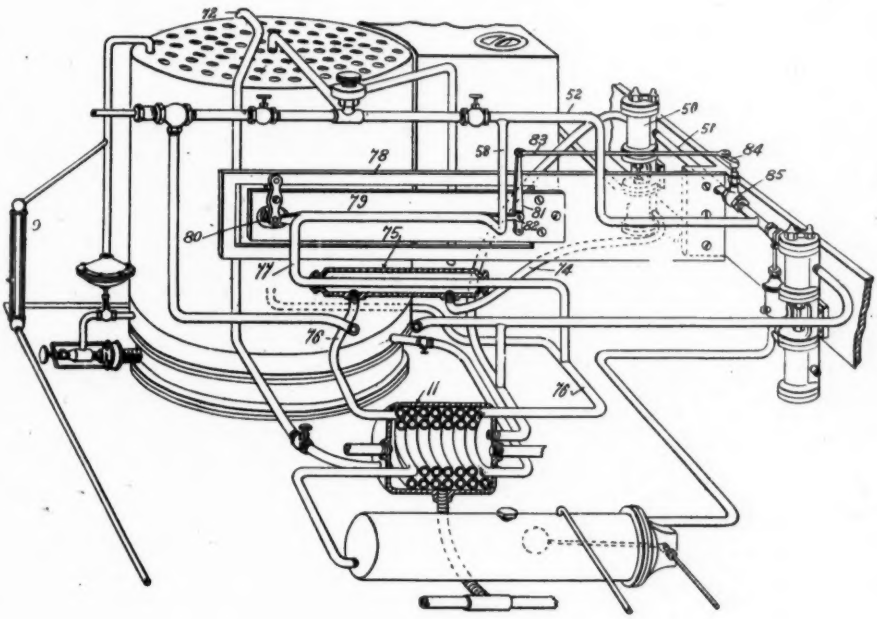
The patent in question is one of the most comprehensive of any allowed on motor-vehicles, including no less than eighteen drawings, of which only one is shown here, and covering eleven pages of printed specifications. The language of the specifications is particularly clear and free from technical verbiage, and explains many of the features of steam vehicles in a manner that is well worthy of consideration by all who are interested in the industry and may also prove of interest to users of steam carriages or prospective buyers thereof. The Motor Age regrets that space prevents even a resume of all the points covered by the patent. To those who are interested in the subject it would suggest that they write a letter addressed "Commissioner of Patents, Washington, D. C.," enclosing five cents and asking for a copy of the patent, being sure to state the number as given above.

The illustration presented herewith is interesting both in showing the portion of the mechanism about to be described, and also for showing, in detail, the various mechanism of a steam motor carriage, exclusive of the engine and transmission gear.

The mechanism indicated by reference numbers is one for maintaining the water in the boiler at a constant level. The principal portion thereof is the U-shaped expansible tube 77, the upper arm of which lies a little below the normal water level of the boiler, and which is connected with the pipe 58, which has direct connection with the steam space of the boiler. The lower arm of the U-shaped tube 77 is connected with the pipe 76, which is connected with the water space of the boiler after having passed through the cold water jacket 75. It will be seen that the rise and fall of the water in the boiler will be accompanied by a like rise and fall in the tube 77. This tube 77 is supported on a metal base, secured to the wagon body. This metal base is made up of two parts, 78 and 79, so arranged that their expansion and contraction will counteract, one on the other, in such a manner that the regulating mechanism will not be prevented from forming its functions by heat without itself. A stable point of support 80 is thus provided, upon which the upper portion of the U-shaped tube 77 can operate against the mechanism at its opposite end. This mechanism consists of a lever 81, secured pivotally to the base 78, 79 and pivoted to the tube 77 by the lug 82. The end of the lever 81 is connected to the rod 83, which is connected to the lever 84, which operates the valve 85 on the pipe 51. This pipe 51 is connected at one end to the pipe 52, which connects with the steam space of the boiler and with the steam cylinder 50 of the feed pump which supplies water to the boiler.

When the water is at its normal level in the boiler, the upper portion of the pipe 77 will be filled with water of a temperature much lower, of course, than that of the steam. As the water level in the boiler becomes lower, the water in the upper arm of the pipe 77 will run out and this portion of the pipe be filled with steam. The pipe will then expand, and, through the lever 81, rod 83 and lever 84, will open the valve 85, admitting steam to operate the feed pump 50 and the

water in the boiler will be replenished. When the water arrives at the proper level in the boiler the upper portion of the tube 77 will again be filled with water and the tube will contract, and, through the intermediate mechanism, close the valve 85 and stop the feed pump 50. That it may act with the greater certainty, the lower part of the tube 77 passes through the jacket 75, filled with cold water, and the water in 77 is consequently cooled to such a degree as to properly contract the



OVERMAN AND BULLARD'S AUTOMATIC BOILER FEED.

upper arm of the pipe 77 and thus prevent an oversupply of water from entering the boiler.

This jacket 75 connects with the feed pipe 74 through which the cold water is forced by the pump 50, on its way to the boiler, passing from the jacket 75 through the pipe 76, which is coiled in the exhaust box 11, where it becomes heated before reaching the boiler.

No less than twenty-five claims are allowed in this patent, some of them of very considerable strength.

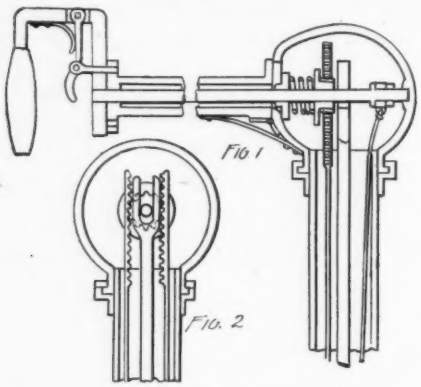
SUTCH'S OPERATING LEVER

Letters patent No. 648,059 to Edwin S. Sutch, Philadelphia, Pa., assignor of one-half to Daniel T. Keenan, same place.

The object of Mr. Sutch's patent, is to provide a single handle by means of which he can control all the operations necessary to navigate the vehicle to which it is attached. In doing this he uses a lever of the pattern shown in the illustration, in which Fig. 1 gives a longitudinal sectional view and Fig. 2 a transverse sectional view.

By moving the handle, shown in Fig. 1, to the right or left, the entire mechanism is moved and the vehicle steered. By withdrawing, with one finger, the spring engaged pin, the handle may be revolved and the pinion engaged with the

two racks (see Fig. 2) will raise one or the other of the racks and the rod connected therewith, according to the direction in which the handle is turned, and the speed will be changed forward or back. By pulling on the handle, the rod



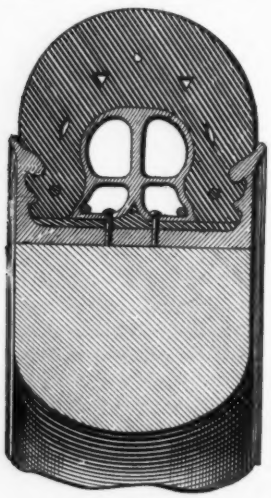
Sutch's Operating Lever.

attached thereto will be withdrawn from its seat at its opposite end, when a downward pressure will cause the vertical rod, shown at the right hand part of Fig. 1, to raise and the brake will be applied.

The device is protected by the six claims allowed in a fairly strong manner.

COLLETT AND MEARS' TIRE

Letters patent No. 648,240 to Jules A.



Collett and Mears' Tire.

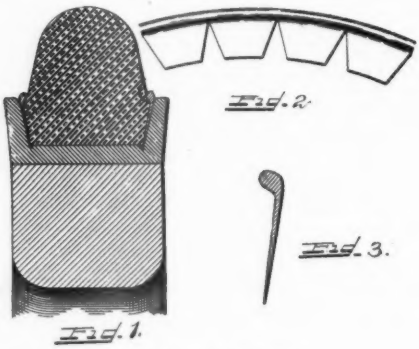
Collett and Elmer E. Mears, of New York City.

This is one of the many patents issued for vehicle tires of the solid or cushion variety, this one being a cushion tire. In this tire, the principal point that is covered by the five claims is the use of what is termed a "filler," which is secured to the rim by bolts and which leaves recesses at either side for the seating of the rubber sides of the tire proper. The methods employed to hold the tire in place can be understood by reference to the illustration.

CARLSHAW'S TIRE FASTENING

Letters patent No. 648,021 to John W. D. Carlshaw, Chicago, Ill., assignor of one-half to John C. Smith, same place.

The device covered by Mr. Carlshaw is a tire, shown in Fig. 1, held in place by a band of the same shape shown in



Carlshaw's Tire Retainer.

Figs. 2 and 3, set between the rim and tire, on either side of the latter after it has been seated in the rim. The ends of the retaining bands are secured together after the tire and bands are in place.

BORBEIN'S SPRING BEARING

Letters patent No. 648,018 to Henry F. Borbein, St. Louis, Mo.

Mr. Borbein is the head of the well known firm of H. F. Borbein & Co., of St. Louis, manufacturers of automobile running gears and parts for the trade. Mention of the running gear is made in another portion of the present issue of the Motor Age.

The object of the present invention is to provide a bearing for vehicles having revolving rear axles, in which the bear-

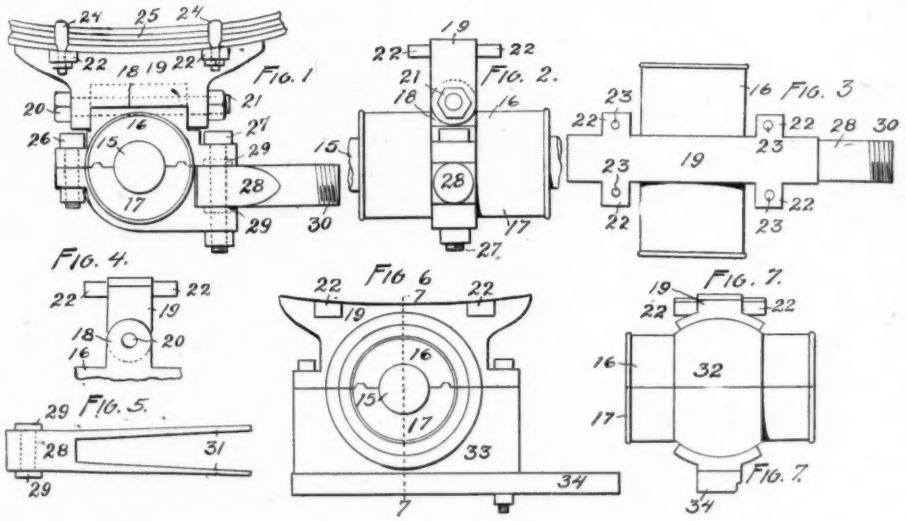
ing is held in such a position as to be unaffected by the movement of the body upon the springs, which, in the ordinary bearing, tends to make the bearings bind. The object is admirably accomplished and the six claims allowed on the patent are very strong, being brief and to the point.

In the illustrations, Figs. 1 to 4 show one form of the bearing, while Figs. 6 and 7 show a modification thereof.

Fig. 1 is an end view, Fig. 2 a side view, Fig. 3 a top view and Fig. 4 a sectional side view of the upper portion of the bearing.

The bearing is formed of an upper part merely holds the parts together and does not furnish the wearing-surface. The spring-block 19 has formed on it lugs 22, provided with perforations 23 for the reception of the ends of clips 24, which secure the block 19 to the spring 25 (Fig. 1). This obviates the use of spring-plates or clip-bars and furnishes a neat and ready method of securing the spring-block to the spring.

The upper and lower parts 16 and 17 of the bearings are secured together by means of bolts 26 and 27. The bolt 27 also secures in position a reach end 28. The reach end 28 is provided with bosses 29, which project into suitable recesses



BORBEIN'S SPRING BEARING.

16 and a lower part 17, so as to allow of its being readily placed in position around the axle 15.

In the form of the bearing, as shown in Figs. 1 and 4, the upper part 16 of the bearing is provided with an inwardly projecting portion 18, which has a convex top corresponding to a concave face in the lower part of the spring-block 19. The spring-block 19 is secured to the upwardly-projecting portion 18 by means of a bolt 20 and nut 21. This construction gives a wearing-surface between the block 19 and the upwardly-projecting part 18 independent of the bolt 20, which in the parts 16 and 17, thus providing a wearing-surface between the reach end and bearing independent of the bolt 27. The reach end may be threaded at 30, as shown in Figs. 1 and 3, so that it may be secured to a reach formed of metal tubing, or it may be bifurcated, as in 31 of Fig. 5, so as to receive between its arms a wooden reach. The pivoting of the spring-block 19 to the bearing prevents any binding of the bearing on the axle when one of the wheels passes into a depression or over an obstruction, which would otherwise take place. The pivoting of the reach 28 to the bearing prevents

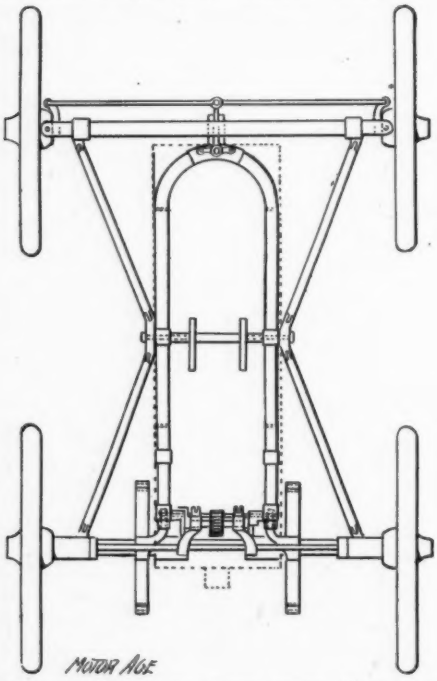
any strain being communicated to the bearing by the reach.

In the modification shown in Figs. 6 and 7 the bearing has formed at its central portion a spherically-shaped part 32, which fits in corresponding recesses in the spring-block 19, and a block 23. This construction allows of movement between the spring-block and the bearing, as in the one already described. The reach 34 is secured directly to the block 33 and also has movement in respect to the bearing owing to the ball-and-socket joint above described.

KIDDER'S MOTOR VEHICLE

Letters patent No. 648,210 to Wellington Parker Kidder, Boston, Mass.

This is a lengthy document embracing five pages of drawings, many of which are not pertinent to the claims allowed. It would be impossible to give anything like a complete description of the mechanism which Mr. Kidder describes



without taking up more space than the Motor Age can spare.

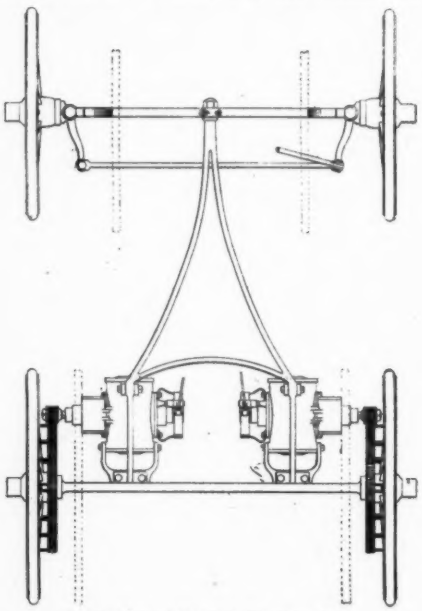
The vehicle shown, employs a fire-tube boiler and a steam engine and the principal claims allowed refer to the manner of supporting the crank shaft in constant relation to the transmission, which is carried on the rear axle and the spring support of the engine itself. The illustration given does not show this construction with any great clearness, but does show the manner in which the main portion of the running gear is constructed. The U-shaped supporting frame is pivoted to a spring-carried block and is so built that it can move slightly forward and backward. The struts at the side are provided with joints to allow of the vertical play of the front axle. Owing to their position they will cause a slight forward and backward movement of that axle, which is permitted by the pivot set in the spring-supported block.

Fourteen claims are allowed this patent.

WOODS' RUNNING GEAR

Letters patent No. 648,014 to Clinton E. Woods, Chicago, Ill.

Mr. Woods is the head of the big Woods Motor Vehicle Co., the leading au-

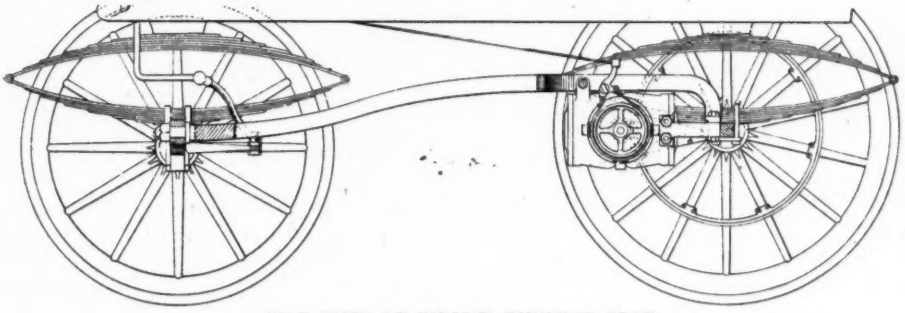


Plan View of Woods' Running Gear.

tomobile company of the west. The two illustrations, showing a side elevation and a plan view, give all the information that could be obtained in a lengthy description. The front axle is pivoted on the perch to give lateral motion, the rear

axle is stationary and two motors are employed, transmitting the power direct to the two rear wheels by means of pinions, the construction employed in the Woods vehicles.

The two claims allowed cover only the specific method of construction shown in the illustrations.



SIDE VIEW OF WOODS' RUNNING GEAR.

GREFFE'S MOTOCYCLE

Letters Patent No. 648,070 to Joseph Greffe, Paris, France.

This patent covers, by one poor claim, a motocycle in which the motive power, electric presumably, is carried on either side of the single front wheel, which is both the motor and steering wheel. The claim is on the fifth wheel device by means of which the front wheel, together with the motive power, is turned in the body of the vehicle in order to accomplish the steering. The device might be practical as a means of converting ordinary vehicles into automobiles, but as applied to a motocycle itself, it can safely be set down as valueless.

INDEX

INDUCTION COIL CONSTRUCTION

The Motor Age has received a number of inquiries in regard to the construction of induction coils for gasoline engines, together with inquiries as to the reason for the method of construction given in reply to a correspondent and its advice to buy his coil instead of experimenting. The advice to buy was and is sound. The construction of a perfectly satisfactory induction coil can be accomplished only after tedious and expensive experimenting.

However, the following description of the theory and construction of induction coils, from the pen of C. E. Rimington in the Automotor Journal, covers all the points as thoroughly as can be done in a limited space. Mr. Rimington says:

It will be advisable, before going into detail on this subject, to shortly consider the principles of the induction coil, which is used to obtain the spark in the cylinder of the engine. It was first discovered by Faraday in England, and almost simultaneously by Henry in America, that when the strength of a magnetic field inside a coil of wire is changed, an electro-magnetic force is induced in the windings of this coil, this electro-magnetic force being proportional to the rate at which the field is changed, or, as it is generally put, to the rate of increase or decrease of the number of lines of magnetic force through the coil. The electro-magnetic force thus induced will also be directly proportional to the number of turns of wire composing the coil. This is often shown as a lecture experiment by connecting the ends of a bobbin of wire to a galvanometer and thrusting into the interior of the bobbin the pole of a permament magnet; the electro-magnetic force thus induced in the coil, while the magnet is entering it, will give rise to a current which will produce a momentary deflection, or kick, of the galvanometer

needle; on withdrawing the magnet an equal kick in the opposite direction is obtained.

Instead of a permanent magnet an electro-magnet may be used, that is, a soft iron core wound over with a coil of wire carrying a permanent current, and the same results will be obtained when this is introduced into or withdrawn from the bobbin as with the permanent magnet.

But if an electro-magnet be used it will no longer be necessary to actually move it into and out of the bobbin; all that will be necessary will be to keep it permamently inside the bobbin and send a current through its exciting coil so as to magnetise it; this will be equivalent to its sudden introduction into the bobbin, or to break the exciting current, which will be equivalent to its sudden withdrawal.

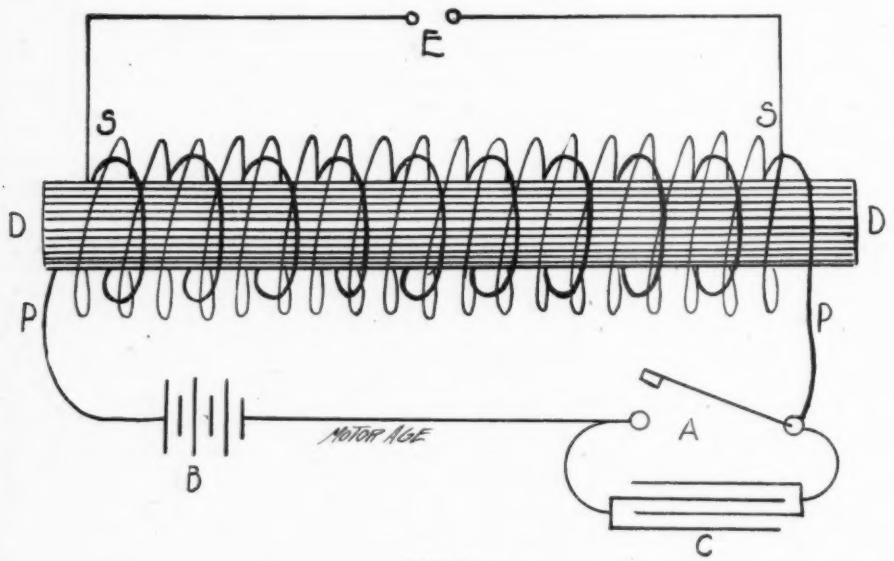


FIGURE 1.

This combination, illustrated diagrammatically in Fig. 1, is called an induction coil.

D, D is the soft iron core, and is composed of a bundle of very soft annealed iron wires. Iron wires are used in place of a solid bar of soft iron for reasons that will appear later.

P, P is a coil of fairly thick wire and comparatively few turns, which carries the exciting current for making D, D into a magnet; this is known as the "primary" coil, and is wound closely over the iron core.

S, S is a coil consisting of a very large number of turns of very fine wire wound over the primary, and is known as the "secondary" coil. A is a contact make and break, and when it is closed the battery, B, is circuited through the primary coil, P, P. E is a pair of sparking points or balls connected to the ends of the secondary coil. C is a condenser, but for the present it may be supposed to be omitted from the diagram. What happens is this:

When A is closed a current circulates in the primary, the iron core is magnetised, and this gives rise to an induced electro-magnetic force in the secondary; on breaking at A, the primary circuit being no longer complete, the primary current ceases, the iron core becomes demagnetised, and an electro-magnetic force is again induced in the secondary, but in the opposite direction to what it was before. The electro-magnetic force induced on making the primary circuit is much smaller than the electro-magnetic force induced on breaking it, for reasons that will be seen in what follows.

As the induction coil is used to produce a spark at E, the electro-magnetic force

induced in the secondary must be sufficiently high to break down the length of air or gas between these sparking points, and will be of the order of 10,000 volts for a spark gap of about one-eighth of an inch. Now, as was mentioned previously, the value of the electro-magnetic force induced in the secondary is proportional to two things—the number of turns of wire in the secondary, and the rate at which the magnetism of the iron can be made to change, or, what is practically the same thing, the rate at which the primary current can be made to increase or decrease.

The first condition is fulfilled by winding the secondary with a large number of turns of fine wire.

We must now consider the second condition.

When a current is sent through a circuit that produces a magnetic field on account of this current, the circuit is said to possess "self-inductance," and the self-inductance of the circuit is larger, the greater the value of the field produced by any given current. It consequently follows that an electro-magnet, such as is formed by the iron core and primary coil of an induction coil, will possess a considerable amount of self-inductance. In any circuit possessing self-inductance when a current is started, as by closing the circuit, this current will not at once attain its full value (equal to the electro-magnetic force of the battery divided by the resistance of the circuit), but will gradually increase from zero to this full value, taking a certain definite time to do so. Theoretically the current never really attains its full value except after an infinite time, practically the current differs from its full value by an amount infinitesimally small after a certain period of time has elapsed, usually only a fraction of a second, the actual time depending on what is termed the "time constant" of the circuit, and which is the ratio of the "self-inductance" of the circuit to its resistance. The reason for this gradual rise of current in a circuit possessing self-inductance is that as the current increases the number of lines of magnetic force threading the circuit, and due to the current, increase; now we have seen that when the number of lines of force in a circuit increases an electro-magnetic force is induced in the circuit. Hence the fact of the current in the circuit increasing means that an electro-magnetic force is produced in this circuit, or is self-induced by the current, and is called the electro-magnetic force of self-induction. This electro-magnetic force must act in such a direction as to try to oppose the increase of current. Otherwise it will be seen the current would become infinite, a fact that would be altogether at variance with the theory of conservation of energy. Hence it follows that the current in a closed circuit cannot either increase or decrease suddenly, as the self-induction of the circuit behaves in an analogous manner to inertia in mechanics, and in fact, is often called electro-magnetic inertia.

When the primary circuit of the induction coil is closed the current will not increase suddenly on account of the self-inductance, but when the contact at A is broken the resistance of the circuit is made infinite and the primary current will suddenly become zero. Hence the electro-magnetic force induced in the secondary will be much greater at break than it is at make, and the spark at E will only take place at break.

Although the primary current has been referred to as suddenly becoming zero at break, this will not be quite the case in practice, on account of the fact that it is impossible to break a spark or small electric arc at the contact points of A, and this spark will mean that the resistance of the circuit, instead of suddenly changing from the value it has when A is closed to infinity, will rapidly but still gradually change to infinity. Now to get the best results from a coil, it is necessary to stop the primary current as suddenly as possible, and it is found that this can best be done by attaching the opposite coating of a condenser or capacity to the opposite sides of the contact breaker, A, as shown at C in the diagram. The theory of the condenser can hardly be gone into here except to say that the electro-magnetic force of self-induction in the primary, which is principally instrumental in causing the spark at break, will expend most of its energy in

charging the condenser, causing the spark to be less and the primary current to become zero considerably more rapidly. The practical effect of the condenser on the spark length obtained from the secondary is enormous; the writer has an Apps soil that when giving a six-inch spark with the condenser on, will not give a one-inch spark if the condenser is disconnected.

To get the best results as regards length of the secondary spark from a coil, the circuit of the primary must be closed long enough to allow the primary current to reach its full value, it must then be broken as suddenly as possible. In large induction coils worked with a vibrating contact there is an arrangement for increasing the tension of the vibrating spring carrying the contact points, so as to keep the primary circuit closed for a longer time when it is desired to get the greatest spark length from the secondary.

Fig. 2 shows the gradual rise of the current in the primary and its sudden fall at break at the point A; the dotted straight line gives the final value of the primary current if it is kept on an indefinite time, and this value is equal to

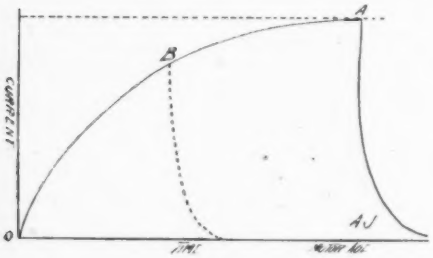


Figure 2.

the electro-magnetic force of the battery over the total resistance of the primary circuit.

If the break occurs at B it is seen that the primary current has by no means attained its full value. It may be remarked that the equation to the curve of rise of current OBA is—

$$C = \frac{E}{R}\left(1 - e^{-\frac{R}{L}t}\right),$$

where C is the current at time t in seconds after closing the primary circuit, E the electro-motive force of the battery, R the resistance in ohms of the primary circuit, L the self-inductance of the same in henrys, and e equals 2.718.. ., the base of the Naperian system of logarithms.

As an example of the rise of current in a coil possessing self-induction, a small electro-magnet has a resistance of 500 ohms, a self-inductance of 5.5 henrys.

Hence $\frac{L}{R} = .011$. Suppose we wish to know how long the current will take to rise to ninety per cent of its final value. Call $C = 90$ and $\frac{E}{R} = 100$, then

$$1 - e^{-\frac{t}{.011}} = .9$$

$$\text{or } e^{-\frac{t}{.011}} = .1$$

$$\text{Hence } -\frac{t}{.011}\log. e = \log. .1 = -1$$

$$t = \frac{.011}{\log. e} = \frac{.011}{.4343} = \frac{1}{40} \text{ sec. about.}$$

This, then, is the time taken by the current to attain ninety percent of its full value.

The reason for having the iron core of an induction coil made of a bundle of iron wires is that if it be a solid bar, currents are induced in it when the primary current is made and broken, these curents would flow round the axis of the core in a series of concentric circular paths; in fact, the bar behaves like a permanently closed secondary circuit, and the effect of the currents induced in it would be to largely diminish the electro-magnetic force induced in the secondary coil, and also to heat up the core. This effect is often made use of in coils used for medical purposes to enable the electro-magnetic force of the secondary and the consequent power of the coil to be easily regulated. A metal tube is made to slide between the primary winding and the bundle of iron wires forming the core, and as this tube is gradually slid in to cover the core the electro-magnetic force of the secondary becomes less and less on account of the weakening or shielding effect of the currents induced in this metal tube. When the core is composed of a bundle of iron wires these wires are practically electrically insulated from one another by the

scale and rust on the surface of the iron, in addition to which the bundle is generally soaked in paraffin wax or varnish before it is inserted in the coil.

Construction of the Coil

The bundle of iron wires, which are carefully annealed by being heated to redness and then cooled very slowly, is enclosed in a tube of ebonite with flanges at its ends. In small coils of spark lengths up to, say, ½ inch, such as are used for ignition purposes, this tube may be composed of several layers of paper soaked in varnish or paraffin wax, the end flanges being of wood.

The primary coil consists of two or three layers of double silk-covered copper wire wound from end to end of the bobbin. For a ¼ or ⅜-inch spark coil number twenty or twenty-two gauge wire is generally employed. The primary is then covered with several layers of varnished or paraffined paper, and the secondary is wound on evenly in layers, each layer being separated from the next by wrapping it with two or three folds of paraffined paper or guttapercha tissue. From four to six ounces of double silk-covered number thirty-six gauge copper wire are used.

In many of the cheap forms of induction coils made in France, the wire employed in winding the secondary is bare, the wire being laid on spirally so that the turns in each layer do not touch one another, the layers, as before, being insulated from one another by wrappings of paraffined paper. In this form of construction, which is, of course, only used for coils of short spark length, the size of the coil for a given spark length will be larger than if covered wire had been used, as it is impossible to get so many turns per layer, and consequently the numbers of layers must be increased.

In coils of greater spark length it is most important that the insulation between the layers should be of sufficient thickness, particularly at the parts near the ends of the bobbin, as here the greatest difference of potential exists between contiguous layers, and if the insulation there is not of sufficient thickness sparking will occur from layer to layer with the consequent breakdown of the coil.

In coils that are intended to give a long spark, the secondary bobbin is divided into a large number of sections by means of ebonite flanges, each section is then wound in the usual way and the sections are then connected up in series. By this means, with well-constructed coils, sparks can be obtained of length even greater than that of the bobbin.

The condenser consists of a number of sheets of paraffined or varnished paper; interleaved with these are a number of sheets of tinfoil cut smaller than the paper so as to leave a margin of one-half to one inch on three sides. The tinfoil is laid on the paper so as to project beyond it at one end, all the odd numbers of the pieces of tinfoil projecting at one end and the even numbers at the other, the bundle thus formed is pressed together and fixed between two varnished boards, and the overlapping tinfoils at one end are squeezed together so as to make good electrical contact and connected to one terminal of the condenser, the same at the other end.

The battery employed for working the sparking coil for petrol motors consists of four dry cells or two to four accumulators, generally made up in one box. The connections are as in Fig. 1.

E will be the sparking plug; one terminal of the secondary coil is connected to the central insulated conductor of the sparking plug, and the other terminal of the secondary to the framework of the motor.

The contact for closing the primary circuit, or A, usually consists of a spring, which is pressed against an adjustable screw by a cam worked from the crankshaft of the motor, the contact parts of both the spring and screw should be platinum tipped. The actual connections can be easily followed out by the aid of the diagram, but it should be borne in mind that in some cases no condenser is used.

The adjustable screw of the contact maker should be set so that a good spark is obtained in the sparking plug. This should be of a blue color.

Causes of Failure

The most frequent source of failure to ensure ignition is the running down of the batteries; in the case of dry cells, they must be replaced by fresh ones;

with accumulators they will probably want recharging. Sometimes one of the cells increases largely in internal resistance, and if this cell be cut out the apparatus may work temporarily with the remaining ones; or one or more of the cells may develop a bad contact where its plates make connection with its terminals owing to corrosion, vibration, or the two combined. Here, again, that cell should be cut out. A small galvanometer of low resistance or ammeter is a useful instrument for testing cells; when the cells are in good order the deflection that each one gives on an instrument of this description should be noted, then if a cell be suspected it should be tried on the ammeter, and if its deflection is much less than the normal it should be removed.

Another cause of failure is a bad connection at one of the terminals or binding screws, owing to the screw jarring loose from the vibration. It would be advisable to make all terminals for use on autocars with double nuts, the second nut to serve as a lock nut. Again, the platinum contacts on the contact breaker become burned and dirty, and should from time to time be cleaned with sandpaper, or, if very bad, a fine file may be used; in time they will require re-tipping with fresh platinum.

Failure may be caused by a black carbonaceous deposit between the sparking points of the sparking plug, or by bad insulation of the wire from the secondary to the insulated part of the sparking plug which may make contact with the frame.

Causes of failure in the coil itself are not so likely to occur, the wires inside the coil may, however, get broken from the vibration, or the insulation of the secondary get destroyed by internal sparking. In either of these cases the coil will have to be taken to pieces and probably unwound.

The best method of first finding out if there is a break in the wire inside the coil is to circuit a battery through a galvanometer or detector in series with the coil, if there is a deflection it shows there is a current and the circuit is complete, if there is no deflection there is a break in the coil being tested. As the secondary wire is of fairly high resistance a high resistance detector must be used, as otherwise the deflection produced, even when the coil is unbroken, will be too small to be observed. As regards breakdown in the insulation of the secondary after having found that the battery, contact break, and connections are right, and that there is no break in the wire or connections inside the coil, the length of spark that it will give should be tried. If this is found to be much shorter than it ought to be, it shows that there is a breakdown somewhere in the insulation of the secondary, and consequent internal sparking.

Suggested Improvements

In regard to the coil in actual use the following from the Motor Car Journal may prove useful:

Given a good induction coil, worked by an efficient battery or accumulator, we can obtain sparks of varying quality according to the distance between the dischargers (which in a motor are the platinum points of the sparking plug wires). Working in a darkened room, we shall find first a faint radiance if the dischargers are a long way apart. As they are moved nearer one another, decreasing the sparking gap, we shall get at intervals bright snapping sparks. Nearer still gives a stream of these snapping sparks, which to the eye appear to travel in a zigzag manner, somewhat like the popular impression of lightning. Finally, when the dischargers are very near together, we get the necessary flaming spark, which appears continuous and to spread out between the dischargers in the shape of an oval sphere. From these experiments we see the necessity of having only a small sparking gap.

Of all coils, for whatever purpose constructed, the contact breaker is probably the most unsatisfactory portion, especially in the larger sizes, and yet it is all-important to have it working satisfactorily.

The number of times contact was made between the screw and the spring of a certain coil, working continuously with a long, steady beat, was found to be 610 per minute.

Now, to apply these observations to the question of electric ignition on, say a tricycle. A series of sparks are more certain to ignite than one single spark. To obtain a series of sparks we must have a number of vibrations take place in a very short space of time. Thus, suppose the tricycle motor is working at 1,000 revolutions per minute, ignition will be required at every second stroke, or 500 times per minute. The effective portion of the cam during which vibrations of the spring can take place is less than one-sixth of its circumference,

giving a space of time rather less than 500x 6, or 1-3000th of a minute. Now, our other experiment only gave 610 beats per minute, so the obvious deduction would be that on our tricycle the spring would have no time to vibrate, but only to fall, giving contact once when it would again be lifted by the cam. Many hold that the motor will give the best result when the screw is adjusted (with the motor stopped and the cam in the proper position) so that upon raising the spring with the finger and suddenly releasing same, it will give a large number of vibrations, and not fall too heavily or too lightly against the screw. This is no doubt correct, but it does not follow that the spring does vibrate, beyond the falling once against the screw, when the motor is actually running. It probably means that when so adjusted the spring is at its best to rapidly respond to the notch, and to touch the screw with just sufficient pressure to secure good conductivity for the electricity.

Finally, do not these experiments point towards improvements in our existing systems?

Could we not arrange to secure several certain makes and breaks in the 1-3000th of a minute? The ordinary induction coil has to provide its own mechanism for working the contact breaker, but with a motor we already have rotary motion and power, and can therewith work a positive contact breaker whose speed of working will increase with the increased speed of the motor. Many dynamos are driven at over 1,000 revolutions per minute, and have commutators made up of as many as twenty strips. One brush would therefore make 1,000x20 contacts per minute, or about seven contacts in our 1-3000th of a minute.

Could we not utilize this system, having a disc of insulating material with a number of metal segments fixed around rather less than one-sixth of its circumference, against which a spring or brush would come in contact, which spring or brush could be removed for the purpose of "advance sparking"? We could then be certain of getting a definite number of makes and breaks in our 1-3000th of a minute, and, as a consequence, more perfect sparking at the plug points.

NEWS OF THE MOTOR INDUSTRY

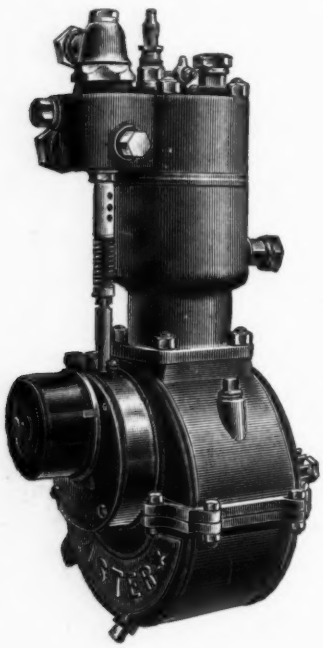
The Lozier Motor Co. of Toledo, Ohio, manufacturers of gas engines and naphtha launches, are in correspondence with the civil authorities of several towns in the neighborhood of New York City with a view to establishing a large plant for the manufacture of gas engines, launches and automobiles. The company were organized about a year ago and are the outgrowth of the naphtha launch department of the firm of H. A. Lozier & Co. of Cleveland, the well-known bicycle manufacturers, whose various plants are now controlled by the American Bicycle Co. The naphtha launch business was not turned over to the bicycle consolidation, but the business has been carried on as before in a portion of the Toledo bicycle plant. The company have now outgrown their present quarters and propose to establish a plant at some seaport or river town within fifty miles of New York. They are building launches up to thirty-five feet, but when located in a new plant they propose to build anything in the boat line up to 100 feet or more, also a complete line of gas engines of all sizes. They are also doing considerable experimental work with gasoline, electric and steam automobiles, and propose to devote considerable attention to the manufacture of vehicles of all varieties.

H. A. Lozier, who has been one of the most successful men connected with the bicycle industry, is at the head of the company and his son, E. R. Lozier, is now general manager. The mechanical end of the Lozier Motor Co. is in the hands of George A. Burwell, formerly superintendent of the Toledo bicycle factory, who has been responsible for very many improvements in bicycle construction. He is the designer of the Burwell gas engine, which the new company will manufacture, and has acquired an extended reputation as an expert on engines of this character. H. A. Lozier, Jr., who is in charge of the Lozier department of the American Bicycle Co. at Cleveland, is

now in New York looking over the field for a location for the plant mentioned.

ASTER WATER-COOLED MOTOR

The accompanying illustration shows the three horsepower, water-cooled, Aster motor. This motor is suitable for small carriages, voiturettes, runabouts, small delivery wagons, and in fact for a vehicle of any kind for which a three horsepower gasoline motor is desired. It is



especially suitable for a delivery wagon or other vehicles for which a low speed is desired, as an air cooling motor of this power can not be run at a very low speed without over-heating.

This motor, although a new addition to the Aster family, has earned considerable reputation for itself by winning a number of races this season. In the first race in Paris this year on February 18, voiturettes fitted with this motor won the first three prizes—Mercier, first; Mourier, second, and Demester, third. On March 31 Van Berendonck won the mile race at Nice, and in the hill climbing race at Esterel on April 1, Von Berendonck also won first prize with his voiturette fitted with the Aster.

ENGLISH MOTOR-VEHICLE EXHIBIT

At Islington, England, on April 14, was opened an exhibit of motor-vehicles, continuing for a day more than a week. The exhibit was very extensive, comprising all styles of vehicles from the lightest gasoline motocycles to the heaviest steam trucks. As in previous British shows, the gasoline propelled vehicles predominated, although the heavy steam vehicles for strictly commercial purposes were largely represented, and a few lighter steam vehicles, for pleasure purposes, were shown. Among the latter was a Locomobile and a Brown-Whitney carriage of American origin. The only exponent of electricity was found in a Waverly stanhope, also from this country.

A NEW INDIANAPOLIS CONCERN

The Indianapolis Automobile & Vehicle Co. has been incorporated in the city whose name the company bears and has secured a factory location at the corner of Temple Avenue and Knowland Street, having a five-story building with a floor space of about 40,000 square feet. Machinery is being installed and is expected to be in complete running order in a few days. This company was formerly the C. H. Black Co., and Mr. C. H. Black will remain as superintendent and general manager.

AUTO STATIONS IN JERSEY

The New Jersey branch of the Electric Vehicle Co. has arranged to install automobile stations at Seabright, West End (Long Branch), Allenhurst, Spring Lake and Atlantic City, all on the Jersey coast. At each of these stations Columbia vehicles, electric and gasoline, will be for sale, and every facility will be provided for charging and caring for private motor-vehicles. Park wagonettes and busses will also be rented.

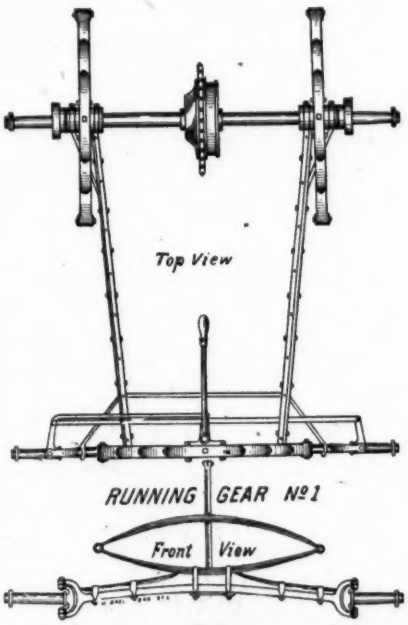
CHANGE IN FIRM NAME

The copartnership hitherto operating as the F. R. McMullin Mfg. Co. was absorbed

on May 1 by the McMullin Motive-Power and Construction Co., a corporation, which latter concern will enlarge and continue the manufacture of gas and gasoline engines and motor-vehicles. The offices of the new company are at 404 and 405 Royal Insurance Building, Chicago.

BORBEIN'S RUNNING GEAR

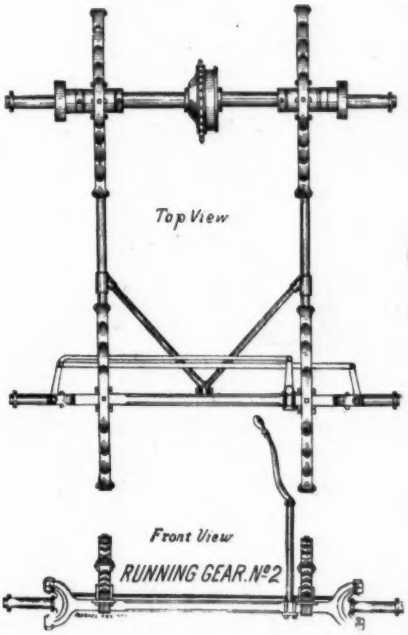
In the weekly budget of patent reports in this issue of the Motor Age will be found a detailed description of the spring-bearing patented by H. F. Borbein, the head of the firm of H. F. Borbein & Co., of St. Louis, dealers in motor-vehicle supplies. This spring-bearing is a meritorious production, as will be admitted by any one who carefully studies the description of the patent, the bearing in actual use conforming to the patterns shown in the patent papers.



This bearing is fitted to running gears supplied by the above mentioned firm. These running gears are made in two forms, as shown in the accompanying illustrations, and are provided with differential gears and sprocket wheels, all ready for the fitting of bodies and motor mechanism of any style. The running gears are sold at a very reasonable price and it will pay any concern turning out motor-vehicles, unless in very large quantities, to get quotations from this house before attempting to make running gears themselves.

TO DEAL IN PATENTS

New York, April 29.—The Automobile Patents Exploitation Co., whose business office is in this city, was incorporated in New Jersey last Monday with a capital of $1,000,000, divided into 2,500 shares of common and 7,500 shares of preferred stock. The object of this company is not to manufacture automobile equipments but merely to purchase patents and lease the right to manufacture under them on royalty. This was all that could be learned by the Motor Age man at present, but he will be able shortly to give full particulars of the new line of motor vehicle business.



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New York, April 30.—The Motor Age representative has learned fuller particulars of the Automobile Patents Exploitation Co. referred to briefly in a previous dispatch.

The new company has at least the backing of Charles R. Flint, and was probably

promoted by him. It is now in process of organization with temporary headquarters at 27 William Street. The officers will be: Thomas Clarke, president; H. A. Wise Wood, vice-president; Thomas Russell, treasurer, and Frederick B. Hyde, secretary.

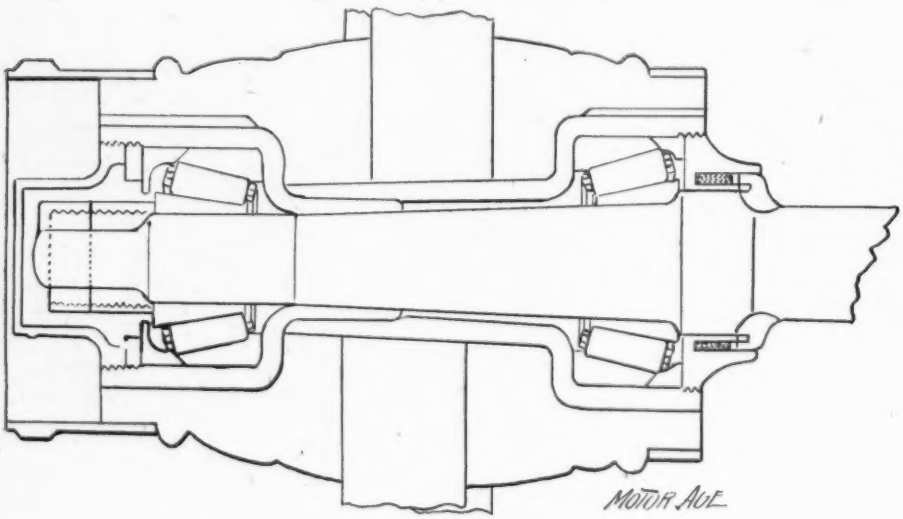
The company, according to its prospectus, undertakes the manufacture of automobiles and motocycles, the examination of automobile patents, and the enlistment of capital for the development of inventions. It furnishes experts to make thorough examinations of patents, specialists to test motors and automobiles, opportunities to inventors to present properly their propositions to concerns willing to consider and to undertake the same, and purchases meritorious patents, licenses and inventions relating to motocycles, motors, gears, automobiles and their parts.

GRANT ROLLER BEARING HUB

The accompanying illustration gives an excellent idea of the construction of the Grant roller bearing. These bearings are very largely used on horse drawn vehicles and have given unvarying satisfaction.

The makers, the Grant Axle & Wheel Co., of Springfield, Ohio, are catering to the automobile trade and finding a ready sale for their true-and-tried bearing.

The illustration shows the bearing fitted to an ordinary wooden hub, but it is made for any style of hub, wood or metal, and is also adapted to revolving axles. In the elaborate catalogue which the company issues, the various styles of the bearing are illustrated. A feature of the company's product is a special hub for Archibald wheels, fitted with steering knuckle for the front wheels of automobiles and rear axle bearings for vehicles fitted with differential drive.



GRANT ROLLER BEARING HUB.

Among the testimonials printed in the catalogue are some from users of automobiles who speak highly of the bearing.

TO BUILD MOTOCYCLES

The incorporation of the Motor Cycle Co. under the laws of Virginia, with an authorized capital of $15,000,000, means that one of the wealthiest and most influential of Wall Street men is back of a scheme to build motocycles. Figuring as one of the incorporators of the company is Benjamin J. Downer, one of the men who represents Charles R. Flint in deals

of this nature. Mr. Flint is the head of the mammoth rubber trust, is interested in the Munger Vehicle Tire Co. and in the Automobile Patents Exploitation Co., and has in many ways shown a keen interest in the automobile business. Impressed with the idea that the future holds a large place for the motocycle, he has turned his attention to this branch of the business.

It is somewhat strange that three of the firms that have taken up the motocycle as their leading product in the automobile industry are firms of almost unlimited means. The Waltham Mfg. Co. has the backing of the principal stockholders of the immense General Electric Co. and the Canda Mfg. Co. has property valued at close to a million dollars and has no calls on it except to make motocycles, besides the large resources whch the stockholders have outside. It would appear that the motocycle business in this country will not want for capital.

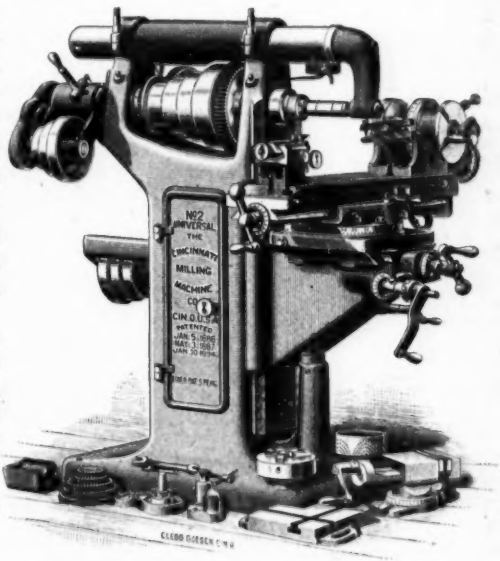
The new Motor Cycle Co.'s stock is divided into $3,000,000 of seven percent preferred and $12,000,000 of common stock. The directors for the first year are Ansel L. White, Benjamin J. Downer and Ernest Hopkinson, all of New York City, and Joseph King, of Norfolk, Va.

INQUIRIES FOR QUADS

New York, April 29.—The Canda Mfg. Co., which has an enormous experimental and manufacturing plant at Carteret, N. J., has completed a hundred quadricycles and just received material and parts for two hundred more. Fifteen or more inquiries for quadricycles are being received by the company daily.

UNIVERSAL MILLING MACHINE

The accompanying illustration shows one of the three patterns of Universal milling machines marketed by the Marshall & Huschart Machinery Co., of Chicago, Cleveland and Cincinnati. The



greatest care has been exercised in the manufacture of these machines, and they leave nothing to be desired in the matter of design, giving results that are both accurate and economical.

TO AND FROM EDITOR AND READER

WANTS AN ALCOHOL AUTOMOBILE

Editor The Motor Age:

Can you give me the address of a manufacturer who will fill an order for an automobile to use alcohol?—either a steam carriage with alcohol fired boiler or an alcohol explosive motor. The inquiry comes from a large distilling firm in the sugar district of the Pacific where alcohol is the cheapest fuel.—Charles F. Schaffer, 811 Drexel Building, Philadelphia, Pa.

—

The Motor Age knows of no firm that is making alcohol motors or burners. The internal revenues on this hydrocarbon, in European countries as well as in America, prohibit its use. Experiments have been conducted, however, in France with alco-

hol explosive motors and the results have been satisfactory. A letter to the editor of La Locomotion Automobile, 4 Rue Chauveau-Lagarde, Place de la Madeleine, Paris, France, would doubtless result in the desired information.

The construction of a vehicle to use alcohol does not, however, involve any great difficulties, and doubtless some American maker would be glad to construct one to order. Among those perfectly capable of doing so is A. W. King, 71 West Jackson St., Chicago.

NO DANGER FROM FENDER ORDINANCE

The following letter from Alderman Frank T. Fowler is in response to a communication from the Motor Age in reference to the ordinance shelved by the last city council, but which its father, Alderman Blake, threatens to re-introduce into the new council, to compel all automobiles used on the streets of Chicago to be provided with fenders. The letter explains itself. Should the proposed ordinance ever got beyond its first reading, the Motor Age feels sure that it possesses enough influence with the city fathers and the executive to prevent its ever becoming a law. Alderman Fowler's letter reads:

—

Editor the Motor Age:

I do not think you need have any fear about fenders on automobiles. We filed the ordinance once in the judiciary committee and I do not think it will again get any further than being introduced and filed.—Frank T. Fowler.

MOTOR RACING AND MOTOR PACING

RUTZ AND HAUSMAN WIN

Louisville, April 29.—Imagine if you will 3,000 people in a frenzy of excitement, standing upon seats, waving hats, handkerchiefs and umbrellas, slapping each other in very excess of enthusiasm, knocking off hats with wildly waving arms and shouting until hoarse, only to drop back in exhaustion at the close!

Murmurs of "Oh my!" and "I'll be d———d!" were heard.

The cause was not hard to find. It was a motocycle contest, the first ever seen in Louisville. The distance, two miles. The competitors, Maya and McFarland, upon a 1¾ horsepower De Dion, Orient motor tandem, and Rutz and Hausman mounted on one of the latest Orient tandems fitted with a 2¼ horsepower Aster motor. The first five laps of the contest were fast. The teams changed about pace and went the first mile in 1:39. They reached the mile-and-two-thirds in 2:45 and then the real race started.

McFarland had the advantage because he had the pole. On the first turn Rutz and Hausman failed to hold the pole at the frightful speed and they lost a length. On the back stretch this was made up and on the last turn they laid over to the work and by hard pedalling held their own. Past the last twelfth-of-a-mile pole it was neck and neck and to the tape it was the race of any man with every one of the four lying down to his work with a will and both motors on full. Across the tape Rutz and Hausman had it by two feet in the good time of 3:15, the last lap in thirty seconds, or a 1:30 gait on a track built for 1:50. That was racing, and, old man at the game as the writer is, he threw his hat far into the air and banged into a seat from very exhaustion.

THE PARIS-ROUBAIX COURSE

Paris, April 20.—The sporting season here has begun. It was officially inaugurated by the Grand Prix of Easter, now in its third year and the great Paris-Roubaix road-race which was established in 1896.

Ordinarily a year or two of life is enough for the average course, but the

Paris-Roubaix course would seem to be an exception to this rule, for to-day it is one of the most interesting international events. Few race meets come to their fifth year with such success. When we cite the Bordeaux-Paris course for the road-race and the Grand Prix and national track competitions we have come to the end.

It will, perhaps, be of interest to give briefly the results of former events over the Paris-Roubaix course. The first year, 1896, was exclusively a cyclist race. There were fifty-four participants and the weather was fine. The struggle was between the German, Fischer, and Arthur Linton, the latter being in the lead until Amicus was reached, when a series of accidents gave Fischer his opportunity which he seized, arriving first at the finish with the time of 9 hours 17 minutes for the 280 kilometers to his credit.

The second year the rains descended, but the fifty-eight competitors fought

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in all sizes and thickness, for any pitch chain; also miscellaneous parts for

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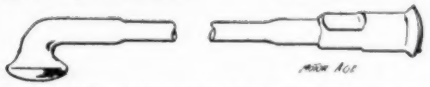

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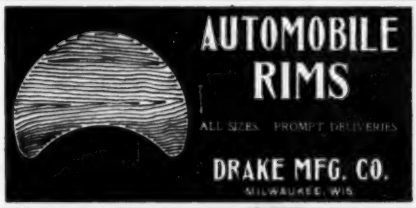

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valiantly notwithstanding. Garin and Cordang after passing and repassing each other at various points along the route finally crossed the tape with Garin ahead by two lengths.

The Hollander fell on entering the velodrome which set him back just fifty yards and lost him the race.

The last half-mile was fought out by the two men in the presence of 10,000 spectators.

The time for the 280 kilometers was 10 hours 43 minutes.

The third year saw the motocycles and light automobiles in the line. Garin again finished first among the cyclists, lowering his record of the previous year to 8 hours 12 minutes. The distance, however, was 12 kilometers less, the race starting from Chaton.

The motocycle class had eighteen participants and the victory went to Degrais who covered the course in 7 hours 29 minutes.

Last year the favor accorded to motor-racing was even greater than before and it shared honors with the bicycle.

There were thirty-two in the cycle class and fifty-seven chauffeurs. Accidents put Garin, Fischer and Bouhours out of the race and Champion won in 8 hours 22 minutes, which was 10 minutes more than Garin's record the year before.

The motor record was lowered two whole hours, Osmont winning in 5 hours 35 minutes 30 seconds.

Beconnais was second and Girardot, third.

This in brief is the previous record of the Paris-Roubaix course.

When the motocyclists lined up for the fifth annual contest there were twenty-nine of them, including most of the prominent motor-wheelmen of France and one woman, but no foreigners.

Promptly at the start Beconnais took the lead and held it to Pontoise (nineteen kilometers), where he was overtaken by Barras, who maintained his lead to Beauvais (seventy kilometers), where he led by one minute. Barras maintained his lead to the finish, Beconnais having many accidents with his tires and his motor. At Breteuil (100 kilometers) Barras had a lead of five minutes over Marcellin, who was then second. The first 100 kilometers (62½ miles) were covered in 1 hour and 27 minutes.

At Arras (200 kilometers) Barras' lead over Marcellin was 22 minutes and he had covered the 200 kilometers in 2 hours and 48 minutes. Barras kept on gaining over the others and reached Roubaix (262 kilometers, or 163 miles) in 3 hours and 48 minutes, with Tart second in 4:28, and Vasseur third in 4:40.

Mademoiselle Lea Lemoine, who also started in the event, was last heard of at Doullens (161 kilometers), which she reached in 2 hours and 28 minutes.

Barras' average time was sixty-nine kilometers per hour (a little less than forty-three miles) and was exactly the same as that of the fastest train running between Paris and Roubaix. This, considering the fact that the course lay over roads that were illy paved, a large part of the distance being over a rough stone surface, is nothing short of marvelous.

The race was marred by a serious accident that occurred at St. Germain, at a turn in the course. Here Martin was leading Lerod by a length or so. As Martin took the turn, he ran to the far side, while Larod, unable to hold the road, which was deep in dust, attempted to take the inside and ran into his fellow competitor. The blinding dust prevented him from seeing where he was going. This same dust blinded the huge crowd which had assembled, at this, the most advantageous place of observation on the whole course, and the result was that the two motocyclists crashed into the crowd, the people going down like wheat before a scythe. The fact that the many bicyclists who were watching the contest had ranged their wheels in front of them prevented the accident resulting more seriously than it did. As it was there were a number of people badly injured, although none dangerously. Martin sustained a broken shoulder and was otherwise hurt. Lerod was more fortunate, suffering only from bruises. A number of the spectators fared badly, including the wife of one of the deputies and another lady in her company, each of whom had broken legs.

This accident has filled the papers with protestations as to the danger of unre-

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...THE MOTOR AGE...

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stricted road races and may be the cause of prohibitive legislation, although the deputy who witnessed the accident acquits the contestants of blame.

M. Pierre Baudin, minister of public works, has appointed a commission to consider the famous decree of March 10, 1899, relative to the use of automobiles on French roads. The debates were presided over by M. Juzon, the counselor of state and director of the public roads. The committee decided unanimously to send a letter to the minister of the interior requesting him to support the decree, which has now virtually become a dead letter. Among other things the decree stipulates that the public guardians shall watch for excess of speed and request offending parties to slow up. It is said that rather than become objects of derision on the highways the policemen have been accustomed to let them go by.

The committee adopted the following resolution: That all automobile vehicles built to exceed thirty kilometers per hour should have a number or device stating that fact to be placed upon them in some conspicuous place. Following this order, numbers will be distributed throughout France.

The committee, however, rejected the two amendments, the first regarding the suppression of the trumpet, and the second, concerning the abolition of racing.

CHANCES FOR GORDON-BENNETT CUP

In the Paris correspondence of the Motor Car World (London) the question of the chances of the various makes of motor-vehicles in the race for the Gordon-Bennett cup, and other leading racing events to be decided in France the coming season, are most intelligently d scussed.

The correspondent first discusses the question of increased horsepower by means of which many of the makers are endeavoring to add speed to their vehicles. He then points out the fact that the speed efficiency of a racing car depends, to a large degree, upon the ratio maintained between the horsepower and the weight of the vehicle and shows that the greater number of makers are increasing the horsepower of vehicles at the expense of weight, a number of whom have built, or have under construction, cars that range from twenty-five up to forty horsepower.

The makers of the Panhard-Levassor and Mors racing cars have, on the other hand, seen the necessity of both increasing the power and reducing the weight, if the best results are to be obtained. The correspondent says that the motors in these two makes of cars are being made much lighter than motors of similar power in other makes and that the construction of the cars themselves is also being lightened.

In the Panhard-Levassor cars, the body has been almost entirely omitted, the driver sitting on the gasoline tank, surrounded only by a sheathing of aluminum, while the attendant sits on the floor of the car, his legs hanging in a sort of cul-de-sac. Wheels are very much reduced in weight, the spokes being but half the size of those ordinarily used and the tires being reduced from 120 millimeters in diameter to ninety (from three to 2 1-4 inches). The axles are lightened, levers are shortened and lightened, brakes on the wheels and bronze pulleys on the axles have been eliminated, leaving only one brake on the differential gear, and all rivets are made hollow.

The result of this has been that a sixteen horsepower car covered nearly forty-two miles an hour for several hours in the Pau race.

The Mors cars are built on the same principle and should be capable of about the same results. The greater number of the Panhards, however, will give them the better chance, as accidents are bound to cut a considerable figure in the results.

The chances of American, English and German competing vehicles are passed over lightly, and the prediction made that the Panhard vehicles will carry off the greater number of the principal events.

NOTES OF INTEREST

Eddie Bald, the ex-champion, is delighted with motocycles both for riding and fol-

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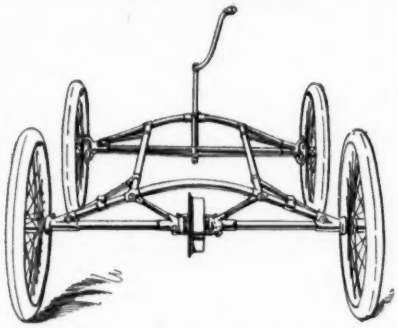

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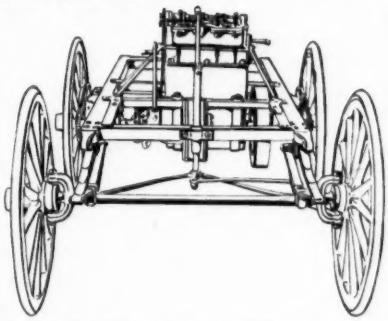

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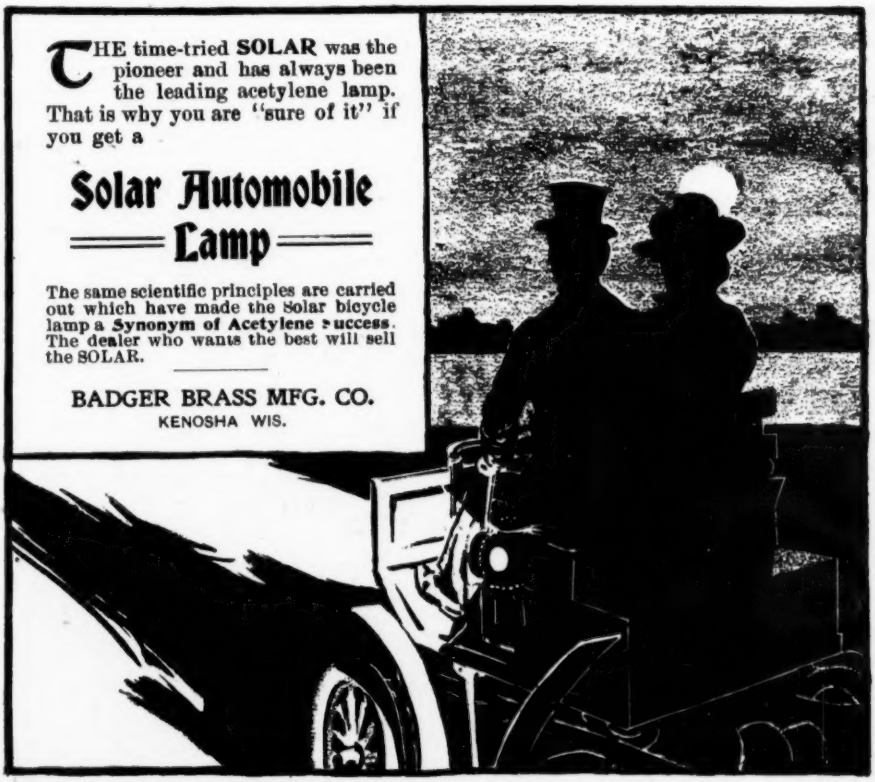

lowing. Bald has been practicing on McFarland's machine at Fountain Ferry.

Rutz, the New Haven rider, has supreme confidence in Hausman, his team mate, and wants Hausman on the rear seat every time he rides. Rutz won four paced races last season in good time and is said to be a demon back of pace.

Ruel and Hadfield and McEachern and Thompson will have the motor tandems ready May 6. Both motors were constructed in the Smith factory at Newark, and are of special build guaranteed to go fifty-five miles to the hour.

Ray Duer, the amateur one-hour record holder, has secured a new motor. His chums say that Duer needs watching and that he will surely top the field for a while in the amateur ranks before he turns professional, which he will do some time this summer.

With one month of steady training to his credit, Bobbie Walthour, the southern champion, will this week join the northern training colonies and prepare for paced racing, in which branch of the sport his friends and admirers believe he will prosper amazingly.

McFarland says that as sure as fate the close of the present year will see races between riders mounted upon single motors. He believes that these machines will be of sufficient horsepower to allow of forty miles an hour being done and he counts upon big purses for the sensational contests.

The rule of the National Cycling Association limiting the motor pacing machines to twenty-two inches displacement is said to be distasteful to the American Bicycle Co., which has on hand two elaborate steam pacing machines which were used by Major Taylor and Eddie McDuffee last season and which played havoc in the cycle racing field owing to their inaccuracy. The two largest attended meets of the season, Philadelphia and Boston, sent nearly 30,000 people away disgusted with motor paced contests. The machines would not behave and could not be relied upon at any time.

There is no bluffing about McFarland's offer to bet $1,000 as many times as they care to take him up. The money will be deposited in the east and McEachern, Caldwell and Eaton have agreed to take parts of it. McFarland is going after the pace followers especially and says that any style of a race will suit him up to fifty miles.

Johnnie Lake and Ped Hickman, amateur pace followers, will be brought together shortly. Hickman is the southern boy, of stature not one whit larger than Michael and constructed of the material from which cycle riders are made. He has been riding ten years, although but twenty-three now and right in his prime.

Dave Shaffer is said to think so well of Tom Butler that he may decide to return to the track and campaign Butler for the middle-distance championships. The decision of Michael to return under the management of Kennedy, with whom Shafer had a misunderstanding, may be an added inducement to the latter to return.

While there is a lot of talk going on about the motor championship, one team must not be overlooked. McFarland and Stevens form a combination on a motor cycle which will be hard to beat, as their own ability added to a fast motor with their inherent good judgment and consummate daring, will make them a terrible team to ride against.

Jimmy Michael's official announcement of his return to the cycle path added much interest to the season and the size of the purses for middle distance contests immediately arose. Michael will be managed by Jim Kennedy, formerly of the American Cycle Racing Association. He will train for a month before he races and will then make an active campaign. Michael is in Waltham now making arrangements for his pace. He has already had offers of purses up to $2,000 in value.

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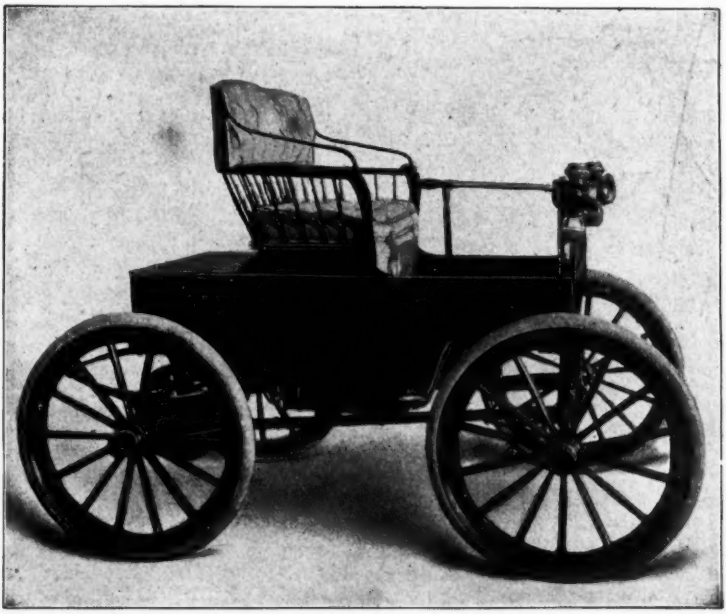

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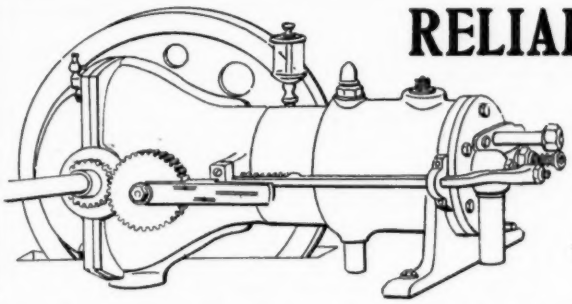

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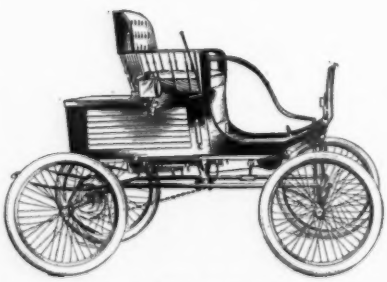

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